

IN THE CLAIMS

Cancel claim 2; amend claims 1, 3 and 6; and add new claims 11-16 as follows:

1. (Currently Amended) A method for fabricating semiconductor devices comprising at least: a first step for forming a first insulating material layer on a sample; a second step for forming on said first insulating material layer a second insulating material layer including at least a porous low-k film with a dielectric constant less than 2.5; a third step for patterning said second insulating material layer by a plasma etching method; a fourth step for depositing a metal film on said second insulating material layer by a sputtering method; a fifth step for forming a copper layer on said metal film; and a sixth step for removing an unnecessary portion of said copper layer by Chemical Mechanical Polishing, wherein all the processes from said third to said fourth step are performed under dry process conditions in which said sample is not exposed to the atmosphere during all the periods from the start of said third step to the end of said fourth step, said third step for patterning said second insulating material layer includes at least a step for forming a via hole, and a pure water treatment for cleaning said sample with

pure water ~~is~~ provided after said sixth step.

2. (Canceled).

3. (Currently Amended) The method for fabricating semiconductor devices according to claim 1, further comprising, after said third step and before said fourth step, an etching process for removing predetermined part of said first insulating material layer by etching by means of plasma of a mixed gas containing at least NF_3 and ~~Ar~~ through an opening patterned in said second insulating material layer in said third step.

4. (Original) The method for fabricating semiconductor devices according to claim 3, wherein said etching process is performed by setting the bias electric power per unit sample area applied to the sample to below $0.16\text{W}/\text{cm}^2$.

5. (Previously Amended) The method for fabricating semiconductor devices according to claim 3, wherein said etching process is performed by setting the processing plasma pressure to below 0.5Pa .

6. (Currently Amended) The method for fabricating semiconductor devices according to claim 3, further comprising, immediately after said etching process, an oxidizing a process for subjecting to said sample to an O₂ plasma processing and after said oxidizing process, a reducing process for subjecting said sample to a or H₂ plasma processing, wherein said sample surface is oxidized and then reduced, consequently cleansed.

7. Canceled.

8. (Previously Amended) A dry etching method comprising using the plasma etching processing apparatus comprising: a sample table for placing a sample provided in a reduced pressure processing chamber; gas introduction means for introducing a processing gas into said reduced pressure processing chamber; exhaust means for exhausting said processing gas out of said reduced pressure processing chamber; and means for generating plasma of said introduced processing gas in said reduced pressure processing chamber, further comprising: magnetic field apply means for applying a

magnetic field to said sample provided on the back surface of said sample; and voltage apply means for ON-OFF applying to said sample a negative DC voltage in which the OFF period of the ON-OFF application is below 10^{-6} seconds to etch an insulating film deposited on a copper layer provided on a sample under the conditions of said negative DC voltage of below 200V.

9-10. Canceled.

11. (New) The method for fabricating semiconductor devices according to claim 3, wherein said mixed gas contains NF_3 and Ar.

12. (New) A method for fabricating semiconductor devices comprising at least: a first step for forming a first insulating material layer on a sample; a second step for forming on said first insulating material layer a second insulating material layer including at least a porous low-k film with a dielectric constant less than 2.5; a third step for patterning said second insulating material layer by a plasma etching method; a fourth step for depositing a metal

film on said second insulating material layer by a sputtering method; a fifth step for forming a copper layer on said metal film; and a sixth step for removing an unnecessary portion of said copper layer by Chemical Mechanical Polishing,

wherein after said third step and before said fourth step, there is an etching process for removing predetermined part of said first insulating material layer by etching by means of plasma of a mixed gas containing at least NF_3 through an opening patterned in said second insulating material layer in said third step,

all the processes from said third to said fourth step are performed under dry process conditions in which said sample is not exposed to the atmosphere during all the periods from the start of said third step to the end of said fourth step, and

a pure water treatment for cleaning said sample with pure water provided after said sixth step.

13. (New) The method for fabricating semiconductor devices according to claim 12, wherein said mixed gas contains NF_3 and Ar.

14. (New) The method for fabricating semiconductor devices according to claim 12, wherein said etching process is performed by setting the bias electric power per unit sample area applied to the sample to below $0.16\text{W}/\text{cm}^2$.

15. (New) The method for fabricating semiconductor devices according to claim 12, wherein said etching process is performed by setting the processing plasma pressure to below 0.5Pa .

16. (New) The method for fabricating semiconductor devices according to claim 11, further comprising, immediately after said etching process, an oxidizing process for subjecting said sample to an O_2 plasma processing and after said oxidizing process, a reducing process for subjecting said sample to a H_2 plasma processing, whereby said sample surface is oxidized and then reduced and consequently cleansed.